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PATENT CLAIMS

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- 5 1. A device for measuring temperature of the inside of an inaccessible movable mechanical part, comprising a temperature-sensitive element with a SAW chip (11) with temperature-dependent transfer function, where the SAW chip has a transducer designed to be connected to an antenna (17) mounted on the outside of said part, characterized in that the temperature-sensitive element is provided in an encapsulation (14; 15; 15a) which is designed to be placed and kept in position in a mounting hole in said moving part and thus to measure
- 10 temperature inside the part, and that the device comprises a coaxial transmission line (18) for connecting the antenna (17) to the temperature-sensitive element, the device thus being adapted for measuring temperature deep inside the inaccessible mechanical part while this mechanical part is in motion.
- 15 2. A device according to claim 1, characterized in that said encapsulation (14; 15; 15a) is composed of a hollow bolt (15, fig. 3) designed to be screwed into said mounting hole and where the temperature-sensitive element is arranged internally in the bolt while the antenna is provided at the part of the bolt which protrudes from
- 20 said part.
3. A device according to claim 2, characterized in that said bolt (15, fig. 3) is filled internally with a material (19) which keeps the temperature-sensitive element in position.
- 25 4. A device according to claim 3, characterized in that said material (19) is epoxy or a heat-resistant rubber sleeve.
- 30 5. A device according to claim 1, characterized in that said encapsulation (14; 15a) is designed to be arranged separately at the lower end of said mounting hole and that the device further comprises a bolt (15b) for closing the mounting hole and a material (19; 19a, 19b) which is designed to be placed between said bolt (15b) and the encapsulation (14; 15a), thus holding the encapsulation (14; 15a) securely in position after mounting.

6. A device according to claim 5,
characterized in that said material (19; 19a; 19b) is a spring which, when the
device is mounted, presses the encapsulation (14; 15a) down against the
lower end of the mounting hole.

7. A device according to claim 5,
characterized in that said material (19; 19a; 19b) is epoxy or a heat-resistant
rubber sleeve.

8. A system for monitoring the temperature inside one or more
inaccessible movable mechanical parts, where there is arranged inside the
respective parts which are to be monitored at least one sensor (1) comprising
a temperature-sensitive element with a SAW chip (11) with temperature-
dependent transfer function, and where each SAW chip has a transducer
which is connected to a respective first antenna (17) which is mounted on the
outside of the respective part,

characterized in that the temperature-sensitive element is provided in an
encapsulation (14; 15; 15a) which is placed and kept in position in a
mounting hole in the respective mechanical part to measure temperature
inside the part; that the temperature-sensitive element is connected to the
first antenna via a transmission line (18),
that for each sensor (1) there is provided a second antenna (2) which is
arranged in such a manner that it can transmit signals to and receive signals
from this sensor (1) via said first antenna (17) while the part is in motion,
said second antenna being connected via a signal cable (5) with a control unit
(3) which, if the system contains more than one sensor (1), comprises a
multiplexer; and

that the control unit (3) is arranged to be able to transmit a polling signal to
and receive a modified polling signal from any of the sensors (1) via an
associated signal cable (5) and associated second antenna (2) while the part is
in motion, the control unit (3) being further arranged to process the received
modified polling signal, and, on the basis of the characteristics of the
modified polling signal, to generate a data signal which is representative for
the temperature of the sensor (1).

9. A system according to claim 8,
characterized in that on said SAW chip there are provided a plurality of
reflectors (13), and that the control device (3) is designed to be able to

measure the absolute phases of the components of the modified polling signal which are connected to the respective reflectors and to generate said data signal by means of the differences between these absolute phases.

10. A system according to claim 8 or 9, characterized in that the control device (3) is further connected to a recording device (4) via a data bus (6) and is arranged to transmit said data signal which is representative for the temperature of the sensor (1) to the recording unit (4).

10 11. A system according to claim 10, characterized in that the recording device (4) comprises a store for storing the received data signals or values which are derived therefrom and a display device for displaying information on these stored values graphically or in the form of alphanumeric characters.

15 12. A system according to claim 10 or 11, characterized in that the recording device (4) is arranged to generate a signal which indicates an alarm condition when it receives a data signal which indicates that the temperature at one of the sensors (1) is higher than a predefined threshold value.

20 13. A system according to claim 12, characterized in that said signal indicating an alarm condition activates a visual or audible alarm.

25 14. A system according to claim 12, characterized in that said signal indicating an alarm condition results in a reduction in the load, a reduction in the drive speed or shutting down of a machine, an engine or a process in which the part whose temperature is being monitored is included.